

# Survey of Serologic Evidence for Syphilis Among the Masai of Tanzania

GEORGE V. MANN, ScD., M.D., ROY D. SHAFFER, M.D., ROBERT ANDERSON, M.D.,  
and HAROLD H. SANDSTEAD, M.D.

**T**HE MASAI PEOPLE of East Africa are Nilo-Hamitic pastoralists who occupy a large highland area along the eastern limb of the Rift Valley. They have maintained their traditional way of life while giving ground steadily to surrounding agriculturists who have been aided in this land pressure by foreign colonists.

It is often said in East Africa that the Masai are heavily infected with venereal disease, although there is little documentation to support this opinion. The belief may be a kind of

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*Dr. Mann and Dr. Sandstead are with the division of nutrition, School of Medicine, Vanderbilt University, Nashville, Tenn. Dr. Anderson is at Meharry Medical College, Nashville. Dr. Shaffer was associated with the African Medical and Research Foundation, Nairobi, Kenya.*

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slander arising from the truculent, haughty, and superior manner which the Masai typically assume and which has complicated the social interaction of this East African tribe with others. If indeed the Masai are heavily infected with venereal disease this must constitute a public health problem deserving attention.

During studies of the behavior of cardiovascular disease among the Masai, an opportunity was available for investigation of the prevalence of venereal disease among them. When the cardiovascular study was arranged, a bargain was made with the leaders of the tribe. In return for submitting to physical examination and the drawing of blood specimens, the tribesmen were to be examined and treated, if necessary, for venereal disease. Accordingly, the clinical and serologic evidence for venereal disease in 406 Masai living in South Masailand of Tanzania (Tanganyika at that time) was investigated during two cardiovascular field surveys in 1962 and 1963.

The customs of the Masai are relevant to the behavior of venereal disease among them. The society is patriarchal and polygamous. A warrior class, called murrans, serves both to protect the tribe and to obtain cattle and women from surrounding tribes. This class is formed at age 12 to 15 years when the boys are initiated into the rites of manhood. These youths then assume responsibilities for defending the clan and the cattle and they acquire certain privileges,

including sexual access to unmarried women who choose to visit the murrans' bachelor quarters, the manyatta, and to those whom they may encounter in the forest.

The murrans are bound to a diet of meat, milk, and blood during his service as a warrior. He belongs to a definite age cohort, all initiated together, and he advances at age 25–30 to the rank of senior murrans. At about age 30 the murrans, having acquired cattle by raiding or inheritance, may take a wife. She is likely to be 10 to 14 years of age. With marriage, he becomes a young elder. As he prospers he will take one to three additional wives, each an adolescent girl. His wives are individually housed in his boma with a distinct system of seniority. Thus in old age a Masai man may have many wives much younger than he. As the old man prospers he comes more in contact with merchants, cattle buyers, and tax collectors and is a more worldly person.

The Masai women are initiated at ages 8–12 years and are thereafter freely available sexually to the unmarried Masai men. The young women are valuable commodities to their fathers, being traded to husbands for cattle. They should be comely, nulliparous, and healthy for this purpose. The methods of contraception used are unknown, but presumably these girls under 14 years of age are relatively infertile (1). The extent of extra-tribal promiscuity is unknown. It is believed that such promiscuity is largely limited to the prosperous elders who have money and can relax from the stern murrans code which bound them in youth.

There is in this social pattern the possibility for a unique epidemiologic behavior of syphilis. If the disease is introduced into the population through the prosperous elders by their contact with neighboring non-Masai prostitutes, then it would be rare in young men and perhaps in children and young women since an old man's



**Masai females gather at the outdoor clinic. The beaded belts are worn by eligible girls, "singiki."**



**A murrin holds spear still being used to protect Masailand.**

wives would have largely passed childbearing age when he became infected. According to this hypothesis, syphilis would be found in men past 40 years and in women after 25 years. It would be rare in either sex under age 25. The children and their mothers should be free of the disease since their young fathers and husbands



**Two medicine men represent the old and the new: Son of Lenana, the most famous of all Masai medicine men, and Dr. Roy Shaffer of the African Medical and Research Foundation.**

would not yet be prosperous enough to have had the extra-tribal contacts. Because of the large age difference in conjugal partners, the prevalence of syphilis would be expected to rise earlier in women than in men and, indeed, some young women with old and prosperous husbands would be expected to have and to transmit congenital syphilis to their children.

We examined this proposal with a cross-sectional survey of the serologic evidence for syphilis in a group of Masai men, women, and children during 1962-63.

#### **Methods**

Sampling of the population was done with the cooperation of the tribal council leaders and in particular that of Parkepo, the paramount chief of South Masailand, who arranged to have groups of people from each of the nomadic clans of his region appear at mobile medical facilities for examination. Because no census has been taken of the Masai, there was no certain way of knowing the proportion of all people in the area who were examined. It is believed that virtually all persons in this area were surveyed.

The men were registered and examined in one mobile unit, the women and children by a separate staff in another unit nearby. The examining staff for both units included three physi-

cians, two registered nurses, three Tanzanian rural medical aides (RMA), two laboratory technicians, and a qualified Masai midwife. This team could examine eight persons per hour. The subjects' ages were estimated by a Masai RMA who was familiar with the initiation groups and age-cohort schemes of the Masai in this region.

Each subject was examined by a physician. The examination included measurement of height, weight, certain anthropometric measurements, and thickness of skinfolds. The subject was placed supine on an examining table and appraised for lesions of skin and skeleton. The eyes were examined for extraocular movements, corneal scars, and evidence of trachoma. The nasal septum was examined for abnormalities. The neck, axilla, and inguinal regions were examined for enlarged nodes. The neck was examined for presence of goiter. The heart and lungs were auscultated. The abdomen was palpated for abnormal organs or masses. Blood pressure was measured in the left arm, using the criteria of the American Heart Association (2). A standard 12-lead electrocardiogram was made. Two samples of blood were drawn into two Becton-Dickinson Vacutainers, one of which contained an anticoagulant (EDTA) and the other did not. The hemoglobin and hematocrit were measured immediately. The serum and plasma were recovered and frozen with dry ice for transport to the United States.

At the conclusion of the examination, the patients were treated for complaints or presenting

signs. These consisted frequently of splenomegaly and fever indicating malaria, anemia, trachoma, or superficial skin infections. Each male over 12 years of age was given 2.4 megaunits of benzathine penicillin intramuscularly at two sites and a bright copper disk on which his examination number was recorded for future identification. (The penicillin was supplied at reduced rates by the Wyeth Co., Philadelphia, through Dr. G. E. Farrar, Jr.) The disk was securely attached to his jewelry. The results of the cardiovascular examination have been published elsewhere(3).

The rapid plasma reagin (RPR) teardrop card test (4) was performed in the field with the children's serum samples. All the serum samples were taken to the Venereal Disease Research Laboratory of the Public Health Service, where the RPR card test was done on the men's and women's samples, and VDRL slide flocculation tests (5) on all the subjects' samples. The serum samples which showed a positive reaction to either the RPR card or VDRL tests were examined by the *Treponema pallidum* immobilization test (5).

## Results

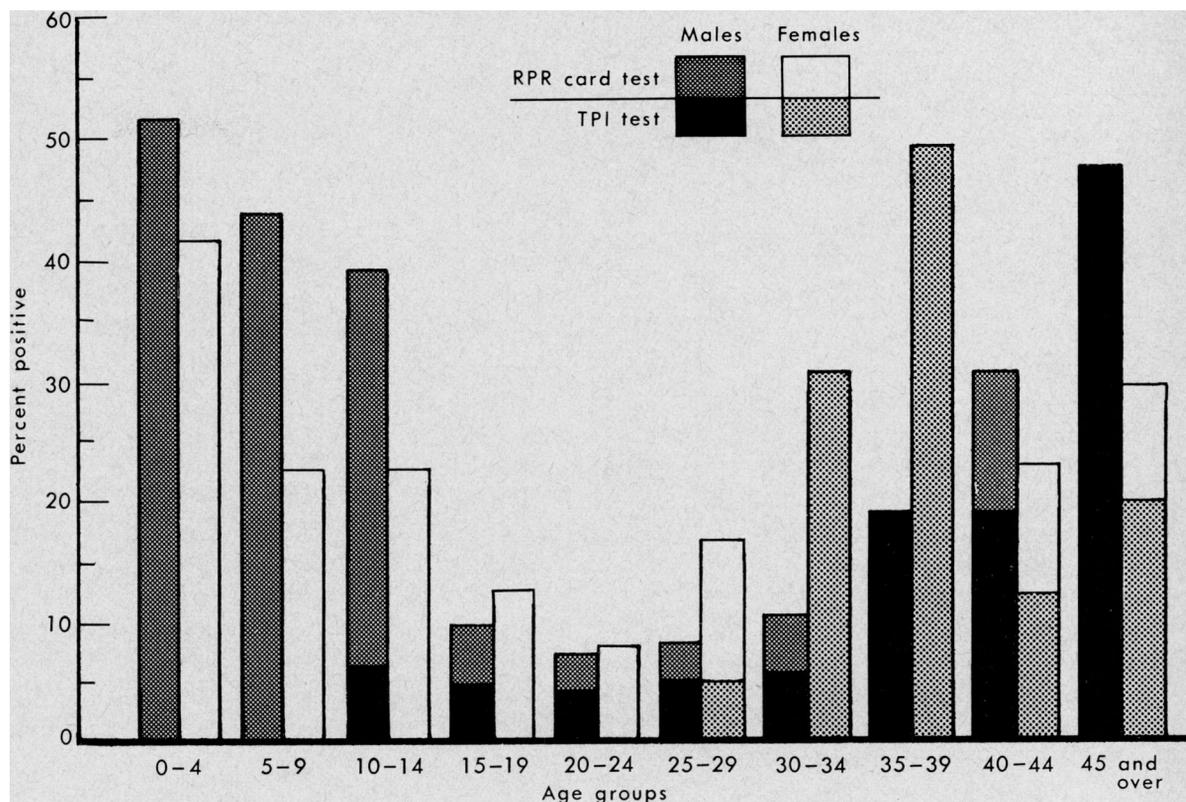
The results of the serologic tests are summarized in the table. Of the 406 persons examined, 65 had positive reactions to the RPR card test—almost half of the young children, about 10 percent of the young adults, and 20 to 30 percent of the older adults. With the VDRL slide test, 71 of the 406 persons showed positive reactions—

### Results of serologic tests for syphilis among the Masai

| Age group (years) | Number | Positive by RPR card test |         | Positive by VDRL slide test |         | Positive by TPI test <sup>1</sup> |         |
|-------------------|--------|---------------------------|---------|-----------------------------|---------|-----------------------------------|---------|
|                   |        | Number                    | Percent | Number                      | Percent | Number                            | Percent |
| 1-4               | 13     | 6                         | 46      | 2                           | 15      | 0                                 | 0       |
| 5-9               | 13     | 4                         | 31      | 4                           | 31      | 1                                 | 7.7     |
| 10-14             | 14     | 6                         | 43      | 3                           | 21      | 0                                 | 0       |
| 15-19             | 35     | 3                         | 12      | 4                           | 13      | 3                                 | 8.6     |
| 20-24             | 89     | 6                         | 6.7     | 9                           | 10      | 2                                 | 2.2     |
| 25-29             | 24     | 2                         | 8.3     | 2                           | 8       | 1                                 | 4.2     |
| 30-44             | 78     | 8                         | 10      | 12                          | 16      | 4                                 | 5.1     |
| 45-54             | 137    | 29                        | 21      | 34                          | 24      | 23                                | 17      |
| 55+               | 3      | 1                         | 33      | 1                           | 33      | 1                                 | 33      |
| Total             | 406    | 65                        |         | 71                          |         | 35                                |         |

<sup>1</sup> Only VDRL positive serums were tested with TPI test.

**Percentage of positive reactors to RPR card and TPI tests for syphilis among 406 masai, by age groups and sex**



the highest proportions occurring among the children and older persons.

When the 71 serum samples positive by the VDRL slide flocculation tests were examined by the TPI test, 35 showed positive reactions. Thus, 35 of the 406 persons were found to have definite serologic evidence of syphilis—a prevalence rate of 8.6 percent. Although the flocculation tests showed positive reactions for 16 to 17.5 percent, about half were false-positive reactions.

The positive reactors to the RPR card test and the TPI test are shown by age and sex in the chart. The high prevalence of positive RPR card tests in children is believed to be related to nonspecific immune globulins. Exceptionally high levels of gamma globulin were found when the serum proteins were separated by cellulose acetate electrophoresis (3).

The physical examinations revealed few recognizable signs of syphilis. Since the subjects were not available for examination after the serologic results were known, it was not possible

to conduct followup investigations. No obvious manifestations of late syphilis were seen. No dental or skeletal signs of syphilis were found. Although saber shins were seen, they may well have been attributed to sickle cell anemia. No gummas were seen. Aortic diastolic murmurs were heard in two men, but both were later found to be serologically negative for syphilis. Corneal scars were abundant, but generally they were attributable to trauma or trachoma. One pair of 7-year-old female twins was found to be serologically positive but without physical stigmata of syphilis. Both girls were VDRL positive but only one was TPI positive. Christie has described dizygotic twins one of whom developed congenital syphilis and the other did not after delivery by a syphilitic mother (6).

**Discussion**

The cultural patterns of the Masai suggested an hypothetical explanation for the epidemiologic behavior of venereal disease in such a popu-

lation. The data in the chart support the hypothesis, because the prevalence of syphilis was low in the Masai up to the age of 30. Among children and young adults the flocculation tests showed a high rate of false-positive reactions; that is, nonspecific flocculation which may be related to the presence of endemic malaria. Among women aged 30–40 years, the prevalence of syphilis increased markedly as indicated by the TPI test. The increase in men began at about age 35 and was highest in the oldest men examined who are the most prosperous and the most worldly. The women over 40, perhaps having lost their charms, had a lower rate. This pattern of serology seems to support the explanation that the disease is introduced into the society by the elders who transmit it to their wives. However, the introduction of the disease seems to have occurred after reproduction so that the children are not infected in utero. The prevalence of serologic evidence for syphilis was very low in both children and young adults.

These data indicate that the cultural pattern of the Masai, while perhaps characterized by intratribal promiscuity, does not often lead to infection with venereal disease among young people. This may be a testimony to the stern tribal rules of behavior. The high prevalence of false-positive flocculation tests might have been expected in this population. While yaws is relatively rare, other protozoan diseases including sleeping sickness and malaria are common and leprosy occurs occasionally. Malaria was found in 4 percent of 23 adult women and in 23 percent of 13 children for whom blood smear tests were made, and trachoma is extremely common. The prevalence of splenomegaly was 33 percent in the adult men examined. The rarity of the clinical stigmata of late syphilis may be a reflection of the late age at which the disease is acquired (7) or it may reflect a unique resistance to late complications of untreated syphilis.

The results of the survey indicate that syphilis is not as serious a problem in the Masai as has been supposed. Control measures should be aimed at the prosperous elders who have access

to women of the surrounding tribes and perhaps also to those tribes and the promiscuous women in them who are presumed to be the source of infection for the Masai.

### Summary

A cross-sectional survey of serologic evidence for syphilis was conducted among 406 Masai of South Masailand, Tanzania, during 1962–63. Three serologic tests were used. The rapid plasma reagin card test and the VDRL slide flocculation test showed positive reactions for about 16 percent, but about half of these were found to be false-positive reactions. The *Treponema pallidum* immobilization test indicated that the prevalence of syphilis was low among persons under 25 years of age, but it increased precipitously in women at about age 30 and in men after age 35.

The results of the survey supported an hypothesis that syphilis is introduced into the population by prosperous elders who become infected from contact with neighboring non-Masai prostitutes.

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